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Here the changes are fewer. The antiquated term "spongiole" is still preserved (p. 257), though for what purpose is not clear. The root-cap, immediately following, is not properly described. On page 310 we still find the statement that about 100,000 stomata "may be counted on an average-sized apple leaf," when, as a matter of fact, it has been known that there are more than that many *on each square inch*. Morren's figures are 246 per square millimeter (*Pringheim's Jahrbüchen für wissens. Botanik*, Vol. IV., p. 190), and these are equivalent to 158,670 per square inch.

The paragraphs on fertilization and hybridization have been entirely rewritten, while that on species has undergone a significant change. Twenty years ago our author wrote the original pamphlet in such away as to involve "original and permanent differences between different species." Then he cautiously admitted a short paragraph about "Darwin's Hypothesis," which he said "is now accepted by many naturalists;" but he says further, in a deprecatory tone, "our object here is not to discuss this intricate question," etc., etc. In comparing these cautious, not to say timid, references in the first edition to the modern idea of the evolution of species, with the treatment of the subject in the new book, one is able to realize the progress we have made in the last score of years. Now the old doctrine is spoken of in the *past tense*! "Such supposed original kinds were called species" (p. 325). A little further on, in referring to the present view, we find this: "On this view a plant species comprises a number of individuals, among which we are unable to distinguish greater differences than experience shows us we should find among a number of plants raised from the seed of the same parent." A very good definition of a species is this.

CHARLES E. BESSEY.

**New Hand-Books of Paleontology.**<sup>3</sup>—The rapid development of the science of Paleontology in recent years, has been naturally followed by the production of text-books which are designed to bring the subject within reach of students and readers. The three works here referred to have the advantage over many similar publications of being the production of experts in the science, and not of mere

<sup>3</sup> *Elemente der Paleontologie von Steinmann und Döderlein*; Strassburg, 1890, 8vo, pp. 829.

*Handbuch der Paleontologie, herausg. von Prof. K. A. von Zittel mit Wirkung von Dr. A. Schenk*. I. Abth., Paleozoologie. III. Band; 3 Lief. Reptilen, 1st part, pp. 437-632, 1889.

*Manual of Paleontology for the use of Students*; by R. A. Nicholson and R. Lydekker; 2 vols., 8vo., pp. 1654; William Blackwood & Sons, Edinburgh and London, 1889.

compilers with no critical knowledge. We have already reviewed the numbers of Professor von Zittel's work as they have appeared, and we now direct attention to the part which includes the first half of the Reptilia. In the arrangement of the class he adopts the following ordinal groups and names: Ichthyosauria, Sauropterygia, Testudinata, Theromora, Rhynchocephalia, Lepidosauria, Crocodilia, Dinosauria, Pterosauria. On this we observe that the name Sauropterygia is antedated by the Plesiosauria of DeBlainville, and Lepidosauria by both the Squamata of Merrem and the Streptostylica of Stannius. In the treatment of the subject Dr. von Zittel has incorporated the latest information from all sources, and has produced the best summary of it now extant. The work meets our approval more entirely than the parts devoted to the fishes and the Batrachia. In the Testudinata we find the results of the recent work done by Dr. Baur, and in the Theromora much is derived from the writings of Seeley. Lydekker is extensively quoted for the Plesiosauria, and American authors are used where necessary. The illustrations are numerous and excellent.

The work of Dr. Döderlein is more compact than that of von Zittel, the families being represented by a few selected genera, no attempt being made to enumerate all of those which are known. The result is a work of less utility to the special student, but of more practical value to the reader who wishes to know only the *capita rerum*. The system of the fishes is considerably in advance of that of the other text-books, since the supposed order of "Ganoidea" is not adopted, and the division Teleostomi is accepted as one of the primary divisions of fishes, a position to which it is undoubtedly entitled. We find the system of the Reptilia a little less full than that of von Zittel, but that of the Batrachia is less open to criticism. The Mammalia are excellent, and the latest information has been incorporated.

The Manual of Drs. Nicholson and Lydekker is of especial importance as the only work of the kind in the English language. We had occasion to review unfavorably the first edition of the work a few years ago, but we must give a different reception to this new third edition. The book has been completely rewritten, and greatly improved in every respect. The department of Vertebrata is, in fact, a new work, the excellence of which is guaranteed by the authorship of Dr. Richard Lydekker. The illustrations are numerous and good, and there is very little in the science which is not in some way referred to in the text. For any but the use of the book as one of reference, many of the genera are too briefly mentioned. The work is not without faults. The systematic, especially that of the fishes, is frequently not quite up

to the requirements of the subject, and the arrangement of the subject-matter is disorderly. We find also an unexpected number of errors of statement in points of American paleontology, as in stratigraphical and geographical position, and in opinions expressed by American authors. We regret that both Drs. Lydekker and Döderlein have reproduced figures of the skeleton of "*Uintatherium ingens*" Marsh; since this fossil is said to consist chiefly of a drawing, modeled after the *Loxolophodon mirabilis* Marsh. C.

## RECENT BOOKS AND PAMPHLETS.

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GARMAN, H.—Animals of the Waters of the Mississippi Bottoms. From the author.

MERRIAM, C. HART, AND BURROWS, W. B.—The English Sparrow in North America. Dept. of Agriculture Bulletin, No. 1. From the author.

RYDER, JOHN A.—The Origin and Meaning of Sex. Ext. Proc. A. N. S., Phila. From the author.

SMITH, S. I.—Oscar Harger. From the author.

McMURRICH, J. P.—A Contribution to the Actinology of the Bermudas. Extract Proc. A. N. S., Phila., 1889. From the author.

MAURICE, CHARLES.—Étude Monographique d'une Espèce d'Ascide Composée (*Fragaroides aurantiacum*). Liege, 1888. From the author.

WOOD, MASON J.—A Catalogue of the Mantodea. Indian Museum.—Contribution to our Knowledge of the Embidæ; An Asiatic Species of *Corydalus*; Trachea in Rhynchæa. Ext. Proc. Zool. Soc., London.—Species of Parathelphusa; New Species of Portunidæ; Structure of Scolopendrella; New Genus and Species of the Rutelidæ; Mode in which Young Astacidæ attach themselves to the Mother; Parantirrhœa Marshalli. Ext. Ann. and Mag. Nat. Hist.—Morphological notes bearing on Origin of Insects: Stridulating Organs in Scorpions; Note on *Mygale stridulans*. Ext. Entom. Socy., London.—New Species of Parathelphusa. Ext. Proc. Asiatic Socy. of Bengal.—New Genus and Species of Land Crabs; Superorbital Chain of Bones in Wood Partridges; Indian and Malayan Thelphusidæ; New Species of Raninidæ. Ext. Jour. Asiatic Socy. of Bengal. All from the authors.

MINOT, C. O.—Uterus and Embryo. Ext. Jour. Morph. From the author.

KORSCHULT, E.—Functionen der Wanderzellen im Thierischen Körper. Extract Naturw. Wochenschr. From the author.

WALCOTT, C. D.—Stratigraphic Position of the Olenellus Fauna. Ext. Am. Jour. Science and Arts. From the author.

FEWKES, J. W.—On a method of Defence among Certain Medusæ. Ext. Proc. Bost. Soc. Nat. Hist., 1889. From the author.